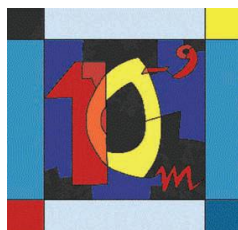


Nano Education and Nano-Safety in Tuscany

Paper presented to : <http://www.unisi.it/eventi/nanotoxicology/>

by: Paolo Manzelli <pmanzelli.lre@gmail.com>; www.edscuola.it/lre.html; www.wbabin.net



“The scale dimension of production of Nanotech.materials is being heralded as a new scientific revolution, one so profound that it will touch all aspects of human society”

-Nano-technology is going to play an extremely important role in the socio-economic change to develop knowledge society of both the advanced and emerging industrial countries for the foreseeable and sustainable future. As a matter of facts Nano-technology need of to built up an essential large-systems of strategic competency, that will require coordination among all sectors of society in order to become a force for enhanced social productivity. So that, it is becoming necessary to realize an advancement innovation in methods and contents of **NANO-EDUCATION** to grow up new ideas of development in society at large.

The model of Nano-Education will be composed by flexible and multidisciplinary modules, realized to train properly qualified and responsible work-power, in order to sustain the social needs to accelerate the innovation of the industry and also to draw maximum possible benefits from this emerging so important field of the contemporary developmental change (1)

Following the above consideration **EGOCREANET** (*), aim to realize the goal to co-organize a new enterprise, e.g. the “**Future Learning Nano -Factory in Tuscany**” (“**FL.N-F.T**”), aiming to develop an e.learning permanent education new methodology, based on the on line web-production and dissemination of nano-didactic materials and demonstrations. This goal of create the “**FL.N-F.**” in Tuscany, will obtain through improving a large network among University, Schools, and Industry, to enhance trans-disciplinary programs in Nano Education, through made linking to various EU-funded similar experiences in permanent and part-time education. (2)

The multidisciplinary and multi-sectoral character of nanotechnologies requires to develop novel forms of integration in the education systems. As a matter of facts in Europe there are various innovative experiences of multidisciplinary WEB –Edition, to disseminate nano -educational materials and popular publication written by scientific journalists; those best -practices in Nano-Education are realized on the basis of interactive activities with students, researchers and managers to advance in nano-science technology and ITC long-distance education (3)

In particular the project -idea “**FL.N-F.T**” would provide to increase the uptake of education in nano-technologies aiming to facilitate the development of a strong social management, especially to improve nano-manufacturing sector, by providing global innovation leadership in this field. The main goal of the project is to cover not only education in nano-science & technology, but also in forecasting societal impact, potential risks and other key concepts of contemporary change of productivity related to the expansion of the applications of the research in nano-dimension.

The “**FL.N-F.T**” project proposal need to be sustained by the Regional and Local Institutions willing to develop opportunities about the responsible advancement of “**clean nano-technologies**” in order that the application of nanotechnologies, will be improved tacking in account the minimization of the potential environmental and human health risks, associated with the manufacture and an extended use of nanotechnology products, and the replacement of existing products with new nano products, this because they have a high chemical aggressivity. Also industry and research participants to the proposal “**FL.N-F.T**”, need to enjoy a fertile in business but also very conscious collaboration to establish a networked infrastructure based on the strategy of open innovation to promote the development of “**green nano-technology**” in Tuscany.

“**FL.N-F.T**” co-organization will realize an advanced Nano-Education on line program, that will be seen in terms of two fundamental integrated dimensions: ') one regarding the diffusion of nano science and technology and ") the other, focused on the the possible inclusion of social and economic science, as a complementary part of the emerging effects of the change of production system, generated by the market development of new nano-materials.(4)

In fact the social and economic challenges of nano-technology is a new arena with high significant potential in

social, political and economic effects, determined by the production of new nano-materials, that in its complexity is able to change the system of production and giving a new organization of skilled workforce. So that the **"FL.N-F.T"** would realize an effective transdisciplinary endeavour in Nano-Education, to illustrate very clearly the new field of nanoscience and tech. into an harmonic coordination to the issues which nanotechnology raises for the society as a whole .

These flexible and remodulable approach of Nano-Education will, be based on short courses, designed for renovate professional working skills in management of industry and of developmental and communication services, to provide insights into the very latest advances in nano-knowledge, and techniques in nano-technology applications, for improving an original study method including real-time online literacy, and tutorials and laboratory for shoving demonstration facilities .

As a matter of facts Nano-sciences reduced size of matter manipulation , so that may allow for automation and computerization of various manual tasks, which were previously inaccessible due to physical dimensional restrictions .So that major benefits of nano-technology include not only improved manufacturing methods, but also water purification in eco-system, more efficient energy development, and have the potential to enhance innovative nano-medicine for the cure of cancer and other illness, and finally permits to develop innovative methods in food production and nutrition and so on.

Certainly this large promises of innovation contain potential risks and threats inclusive of environmental, health, and safety issues, and these can be potentially disruptive if negative effects of nanoparticles are not carefully overlooked before they are released in the market.

As a direct consequence of developing a responsible Nano-Education Program of **"FL.N-F.T"** , the Editorial Board will assume a great importance to focus the production of novel pharmaceutical nano-compounds and cosmetics. This involves the promotion of the studies and best practices for assessing the toxicological effects on the skin, and in other part of the body or to the central nervous system .Hence the priority in the nano-education programs, will give importance to the studies of toxicity coming from the absorption of nanomaterials, carbon nanotubes, quantum dots, fullerenes and silver nano-particles, etc.

Also the program of Nano-Education will be a well focused conscious and ethics aspect to approach the trans-disciplinary organization of the Web Lectures. Besides toxicological information on nano-materials and risks in nano-medicine will be of relevant importance in advanced nano-education web-materials in order to understand the effective risks on the human health. (5) At his scope I would like to remember that the European Commission has requested to EFSA (EU-Food safety Authority) to improve and to disseminate scientific opinion relating to the potential damages arising from nano-technologies especially regarding food and feed safety and the environment. (6) This important request also asks to identify the nature of the possible hazards associated with actual and foreseen direct nano-applications in the important food and feed area, for maintaining nano-safety and security in the working-places. Therefore the **"FL.N-F.T"** will act with a good sector of nano-education toxicology, to provide general guidance on data needed for the risk assessment of such technologies to the exposure to humans workers and to working environment.

In conclusion **EGOCREANET** developing the project -Idea **"Future Learning Nano -Factory in Tuscany "** is conscious to the need to underline that multidisciplinary Nano-Education cover a broad and dynamic field of knowledge and in many ways work as a direct continuation across scientific research and innovation in industry .This has direct consequence in the role of ITC communication, because Nano-Education formats need of collaboration skills able to construct a **"Learning-Factory"** of multidisciplinary training, as a tool to transform into value of change, the old industrial system, based on single business- enterprises, in a networking system, based on the **"Open Innovation"** attitude to grow up territorial complex networking of **"future factories"**, more adaptable to a shared construction method of European Knowledge Society. (7)

BIBLIO ON LINE

- (1)- NEED: [http://www.wbabin.net/Science-Journals/Essays-Miscellaneous/Download/3649 Paolo Manzelli](http://www.wbabin.net/Science-Journals/Essays-Miscellaneous/Download/3649_Paolo_Manzelli)
- (2)- Learning Factory : <http://www.lf.psu.edu/>
- (3) - Nano-Edu-TREE : <http://www.nano.org.uk/educationtree/>
- (4)- Social Challenges of Nano-tech: <http://sei.nnin.org/doc/resource/esrc%20paper.pdf>
- (5)- dangers in Nanotech: <http://www.olonano.com/dangersofnanotechnology.html>
- (6) - ftp://ftp.cordis.europa.eu/pub/nanotechnology/docs/sc_604_call_for_data_nanomaterials.pdf
- (7)- NET-Future Fabric: http://www.edscuola.it/archivio/lre/FOF_prospettive_TNF.pdf
- (*)- <http://www.edscuola.it/archivio/lre/EGOCREANET-2011.pdf>